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EXAMINER	
HUANG, DAVID S	
ART UNIT	**PAPER NUMBER**
2611	

NOTIFICATION DATE	DELIVERY MODE
10/18/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No.	Applicant(s)	
	10/540,682	DAI ET AL.	
	Examiner	**Art Unit**	
	DAVID HUANG	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 June 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-6,8-11 and 13-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *6,10,11 and 13-21* is/are allowed.

6)☒ Claim(s) *9,22,28 and 31* is/are rejected.

7)☒ Claim(s) *3-5 and 8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/20/2010*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/28/2010 have been fully considered but they are not persuasive.

The examiner first notes that in the office action of 3/26/2010, the heading of the rejection of claim 22 mistakenly lists only APA (specification, page 2, line 6 - page 3), Li (US 7,130,365) and Lee et al. (US 2002/0061005). However, the content of the rejection itself also cites Petrus (US 6,177,906), and the §103 rejection of claim 22 was intended to be based on all four references.

Applicants' argument: The Applicants are unable to find any teaching or suggestion of control information that is received one-off by the receiver as being prior art in the cited section or any section of the Applicants' disclosure. Applicants submit that the combination of cited references fails to teach or suggest "carry out baseband processing according to control information received one-off by the receiver" as recited in independent Claim 22.

Examiner's response: As noted above, the combination applied to claim 22 includes references to applicants' disclosure APA, Li, Petrus and Lee et al. With regard to the limitation for "control information received one-off by the receiver," Petrus discloses decision-directed smart antenna combining system (Fig. 6, signal copy, 607, weight calculate and demod 615, essentially a baseband processing block), in which the weight vector is initialized as [1 0 0 ... 0]', such that the initial operation is to calculate an actual weight vector according to equations 8 and 9 (col. 12, lines 1-40). The initialized weight vector is only sent once for initialization, at the outset of the method, and thus "one-off".

Applicants' argument: The combination of cited references fails to teach or suggest "wherein said control information is based upon data outputted from one of a plurality of groups of radio frequency signal processing modules before processing by said smart antennas is enabled" as recited in claim 22.

Examiner's response: As was already discussed in the rejection of 3/26/2010, Petrus discloses decision-directed smart antenna combining system (Fig. 6, signal copy, 607, weight calculate and demod 615, essentially a baseband processing block), in which the weight vector is initialized as [1 0 0 ... 0]', such that the initial operation is to calculate an actual weight vector according to equations 8 and 9 (col. 12, lines 1-40). Looking further at step 2, equation 8 shows the weight vector, which is initialized as above, [1 0 0 ... 0]', and multiplied by the vector of received signal z(t) (each element of z(t) corresponds to a different receive antenna element, col. 7, lines 13-16 and 32-36). The signal copy operation is simply a matrix multiplication of the initialized weight vector with the received antenna signals z(t). While the result of the initial signal copy operation is a combination, the first combination with the initialized weight vector has only one non-zero term. Thus the result of the first signal copy operation comes from only 1 antenna. The next set of antenna weights is generated based this signal copy operation result, and the process is iterated. Thus, Petrus properly discloses "wherein said control information is based upon data outputted from one of a plurality of groups of radio frequency signal processing modules before processing by said smart antennas is enabled" as recited in claim 22.

Applicants' argument: Switching the amplified radio signal to another antenna of the two antennas is not the same as enabling smart antenna baseband processing. The combination of the cited references fails to teach or suggest "wherein said control information at least includes: a

signal used to enable the smart antenna baseband processing down-link pilot time slot data and a Midamble" as recited in claim 22.

Examiner's response: While Lee et al. does not explicitly disclose smart antenna baseband processing, it would have been apparent to one of ordinary skill in the art, working in the field of endeavor of antenna control signals, that the frame structure and control signal implementation of Lee et al. could be adapted to control elements in another antenna system, such as the smart antenna control system disclosed by APA, Li and Petrus. Furthermore, it would have been obvious to one of ordinary skill in the art to provide APA, Li, and Petrus with the frame structure and antenna selection control signal of Lee et al., since implementing it improves decoding performance at a receiver while preventing an increase in complexity at a transmitter.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 28 and 9 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 and 17 of copending Application No. 10/540,791 (line # refer to claim amendment of 7/27/2010) in view of Petrus (US 6,177,906).

Regarding claim 28, claim 1 of application no. 10/540,791 discloses a mobile terminal with smart antennas, comprising:

a plurality of groups of radio frequency signal processing modules, for transforming received multi-channel radio frequency signals to multi-channel baseband signals (lines 2-3);

a smart antenna processing module, for smart antenna baseband processing said multi-channel baseband signals outputted from said plurality of groups of radio frequency signal processing module so as to combine said multi-channel baseband signals into single-channel baseband signals, according to control information received one-off as said smart antenna processing module is enabled (lines 4-7); and

a baseband processing module, for providing said control information to said smart antenna processing module, and baseband processing said single-channel baseband signals outputted from said smart antenna processing module (lines 8-10).

Claim 1 of application no. 10/540,791 fails to expressly disclose providing said control information to said smart antenna processing module according to data outputted from one of the plurality of groups of radio frequency signal processing modules before said smart antenna processing module is enabled, and wherein said control information at least includes: a signal

used to enable the smart antenna processing module, downlink pilot time slot data and a Midamble.

Petrus discloses rapidly converging, decision-directed smart antenna combining system (Fig. 6, signal copy, 607, weight calculate and demod 615, essentially a baseband processing block; see also col. 11, lines 50-67), in which the weight vector is initialized as [1 0 0 ... 0]', such that the initial operation is to calculate an actual weight vector according to equations 8 and 9 (col. 12, lines 1-40). Thus, the initialized weight vector only passes a single antenna signal, and the actual combining of multiple antenna signals, is not enabled until the next converged weight vector.

Therefore, it would have been obvious to one of ordinary skill in the art to provide system disclosed by claim 1 of application 10/540,791 with the smart antenna combining system of Petrus since it improves performance by enabling a rapidly converging method.

Lee et al. discloses utilizing a specific frame structure to improve decoding performance at a receiver while preventing an increase in complexity of a transmitter (page 3, [0029]). The frames have sub-frames having a Midamble and a downlink pilot time slot. Lee et al. also discloses a controller for generating a switching control signal to adjust antenna selection based on the control signal (page 4, [0036]).

Therefore, it would have been obvious to one of ordinary skill in the art to provide claim 1 of application no. 10/540,791 and Petrus with the frame structure and antenna selection control signal of Lee et al., since implementing it improves decoding performance at a receiver while preventing an increase in complexity at a transmitter.

Regarding claim 9, claim 17, dependent on claim 1, of application no. 10/540,791 discloses the mobile terminal is applied to cellular communication mobile terminals or other wireless communication terminals, wireless LAN terminals employing one of following standards: TD-SCDMA, GSM, GPRS, EDGE, WCDMA, CDMA IS95, CDMA2000.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 9, 22 and 28-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art (specification, page 2, line 6 - page 3; hereinafter "APA") in view of Li (US 7,130,365), Petrus (US 6,177,906), and Lee et al. (US 2002/0061005).

Regarding **claim 22**, APA discloses a mobile terminal, comprising: receiving means, for receiving radio frequency signals from the base-station via down-link, wherein the receiving means can transform signals received by smart antennas in the receiving means to single-channel signals to carry out a baseband processing according to control information

APA fails to expressly disclose (i) receiving and transforming multi-channel signals, and (ii) wherein said control information is received one-off by the receiving means and is based upon data outputted from one of a plurality of groups of radio frequency signal processing modules before processing by said smart antennas is enabled, and (iii) wherein said control

information at least includes: a signal used to enable the smart antenna baseband processing, downlink pilot time slot data and a Midamble.

With respect to (i), it is well known in the art that CDMA signals are composed of multiple code channels and that smart antenna technology processes each code channel separately, as evidenced by Li (column 2, lines 7-9 and 11-12).

Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to specify multi-channel received RF and baseband signals in the system disclosed in APA, and that the smart antenna of APA combines the multi-channel baseband signals to generate a single channel baseband signal, since these are all well known in the art for CDMA and smart antenna technology.

With respect to (ii), Petrus discloses decision-directed smart antenna combining system (Fig. 6, signal copy, 607, weight calculate and demod 615, essentially a baseband processing block), in which the weight vector is initialized as [1 0 0 ... 0]', such that the initial operation is to calculate an actual weight vector according to equations 8 and 9 (col. 12, lines 1-40). Thus, the initialized weight vector only passes a single antenna signal, and the actual combining of multiple antenna signals, is not enabled until the next converged weight vector. Furthermore, the initialized weight vector is only sent once for initialization, at the outset of the method, and is thus received "one-off".

Because both APA and Petrus disclose means and methods of smart antenna combining according to control information from baseband processing, it would have been obvious to one of ordinary skill in the art to substitute one for the other for the predictable result of enabling smart antenna combining according to control information received one-off.

With respect to (iii), Lee et al. discloses utilizing a specific frame structure to improve decoding performance at a receiver while preventing an increase in complexity of a transmitter (page 3, [0029]). The frames have sub-frames having a Midamble and a downlink pilot time slot. Lee et al. also discloses a controller for generating a switching control signal to adjust antenna selection based on the control signal (page 4, [0036]).

Therefore, it would have been apparent to one of ordinary skill in the art, working in the field of endeavor of antenna control signals, that the frame structure and control signal implementation of Lee et al. could be adapted to control elements in another antenna system, such as the smart antenna control system disclosed by APA, Li and Petrus. Furthermore, it would have been obvious to one of ordinary skill in the art to provide APA, Li, and Petrus with the frame structure and antenna selection control signal of Lee et al., since implementing it improves decoding performance at a receiver while preventing an increase in complexity at a transmitter.

Regarding **claims 28-30** (claim 30 addressed by item iv below)**,** APA discloses a mobile terminal with smart antennas, comprising:

a plurality of groups of radio frequency signal processing modules, for transforming received radio frequency signals to baseband signals (RF and ADC blocks, Fig. 2, see also RF module 101 and ADC 102 in Fig. 1, page 2, lines 18-22);

a smart antenna processing module, for smart antenna baseband processing said baseband signals outputted from said plurality of groups of radio frequency signal processing modules so

as to combine said baseband signals, according to control information received one-off (SA module 206, Fig. 2); and

a baseband processing module, for providing said control information to said smart antenna processing module and baseband processing said combined baseband signals outputted from said smart antenna processing module (Rake receiver/despreading module 209, Viterbi 210, and baseband control module, Fig. 2; page 3, lines 19-25).

APA fails to expressly disclose (i) that the received radio frequency signals and subsequent baseband signals are multi-channel signals, (ii) the smart antenna processing module combines the multi-channel baseband signals into single-channel baseband signals, (iii) that the control information is received one-off as said smart antenna processing module is enabled, and (iv) wherein said baseband processing module provides said control information to said smart antenna processing module according to data outputted from one of the plurality of groups of radio frequency signal processing modules before said smart antenna processing module is enabled, and (v) wherein said control information at least includes: a signal used to enable the smart antenna processing module, downlink pilot time slot data and a Midamble.

With respect to (i)-(ii), it is well known in the art that CDMA signals are composed of multiple code channels and that smart antenna technology processes each code channel separately, as evidenced by Li (column 2, lines 7-9 and 11-12).

Therefore, it would have been obvious to one of ordinary skill at the time the invention was made to specify multi-channel received RF and baseband signals in the system disclosed in APA, and that the smart antenna of APA combines the multi-channel baseband signals to

generate a single channel baseband signal, since these are all well known in the art for CDMA and smart antenna technology.

With respect to (iii)-(iv), Petrus discloses decision-directed smart antenna combining system (Fig. 6, signal copy, 607, weight calculate and demod 615, essentially a baseband processing block), in which the weight vector is initialized as [1 0 0 ... 0]', such that the initial operation is to calculate an actual weight vector according to equations 8 and 9 (col. 12, lines 1-40). Thus, the initialized weight vector only passes a single antenna signal, and the actual combining of multiple antenna signals, is not enabled until the next converged weight vector.

Because both APA and Petrus disclose means and methods of smart antenna combining according to control information from baseband processing, it would have been obvious to one of ordinary skill in the art to substitute one for the other for the predictable result of enabling smart antenna combining according to control information.

With respect to (v), Lee et al. discloses utilizing a specific frame structure to improve decoding performance at a receiver while preventing an increase in complexity of a transmitter (page 3, [0029]). The frames have sub-frames having a Midamble and a downlink pilot time slot. Lee et al. also discloses a controller for generating a switching control signal to adjust antenna selection based on the control signal (page 4, [0036]).

Therefore, it would have been obvious to one of ordinary skill in the art to provide APA, Li, and Petrus with the frame structure and antenna selection control signal of Lee et al., since implementing it improves decoding performance at a receiver while preventing an increase in complexity at a transmitter.

Regarding **claims 9 and 31**, APA further discloses wherein the mobile terminal is applied to cellular communication mobile terminals or other wireless communication terminals, wireless LAN terminals employing one of following standards: TD-SCDMA, GSM, GPRS, EDGE, WCDMA, CDMA IS95, CDMA2000 (mobile terminal based on TD-SCDMA standard, page 2, line 6).

Allowable Subject Matter

6. Claims 6, 10, 11, 13-21 and 23-27 are allowed.

7. Claims 3-5 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID HUANG whose telephone number is (571)270-1798. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DSH/dsh
10/8/2010
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